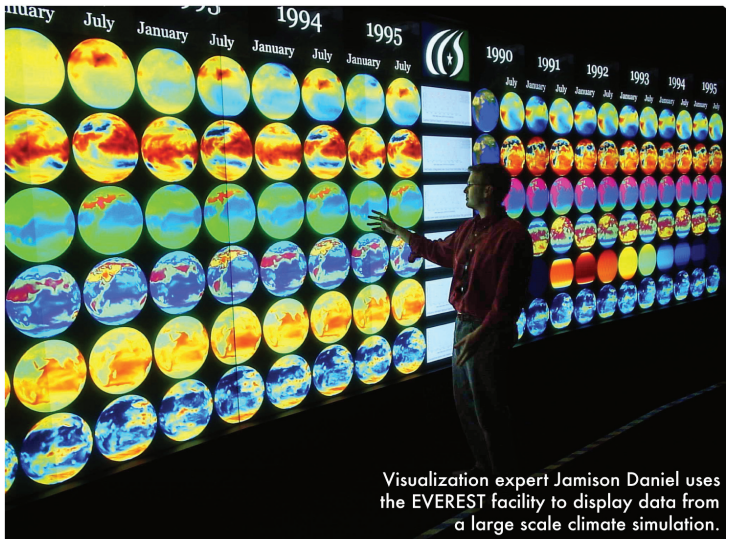
EVEREST EXPLORATORY VISUALIZATION ENVIRONMENT FOR RESEARCH IN SCIENCE AND TECHNOLOGY

# Scientific Visualization Solutions at the Large Scale at Oak Ridge National Laboratory



Visualization expert Jamison Daniel uses the EVEREST facility to display data from a large scale climate simulation.

Oak Ridge National Laboratory's National Leadership Computing Facility gives scientists access to one of the fastest supercomputers — systems that can perform an aggregate peak of 100 trillion calculations per second (100 teraflops) — and the NLCF team plans to increase that computational speed.

The best minds and the best computers aren't enough to get the job done. To extract insights from terabytes of research data and computation results, the scientists at ORNL rely on unique graphics solutions to drive a state-of-the-art powerwall display. Unprecedented image quality and real-time interactivity are enabling discoveries that will shape our lives and our world.

ORNL selected high-end graphics cards to drive the output from a cluster of 64 rendering nodes to a 30x8-foot powerwall. The 27 projectors are arranged in a 9x3 array, each providing 3500 lumens for an incredibly bright display. Displaying 11,520 by 3,072 pixels or a total of 35 million pixels, the wall offers a tremendous amount of visual detail. Scientists no longer need to pan and zoom to view data. Large datasets can be viewed in their entirety on the wall, providing a breakthrough in visualization capabilities for large-scale problems such as analyzing global climate changes or investigating stellar explosions. Scientists can also take advantage of the incredible resolution to gain never-before-seen views of subjects such as large-scale trends in global climate simulations and fine-grained detail in global information system visualizations.

The capabilities that the EVEREST facility provide allow scientists to view collections of data that were not possible to view in the past. Using traditional displays, scientists would only be able to analyze single pieces of a larger problem. Much work was required to imagine how the various pieces fit together. Now, the entire system can be on display collectively — a scientist can focus on the full subject all at once. No more guessing about how the visual pieces fit. Research is greatly accelerated by this visualization ability — we are speeding time to insight and discovery across all disciplines.

## Enabling Scientific Discovery

*Highly parameterized studies*
*Large data exploration*
*Multi-physics feature-detection and tracking*

## Technical Details

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| *Independent displays* | *27* |
| *Aggregate pixels* | *35 million* |
| *Total resolution* | *11520 x 3072* |

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